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PATENT ABSTRACTS OF JAPAN

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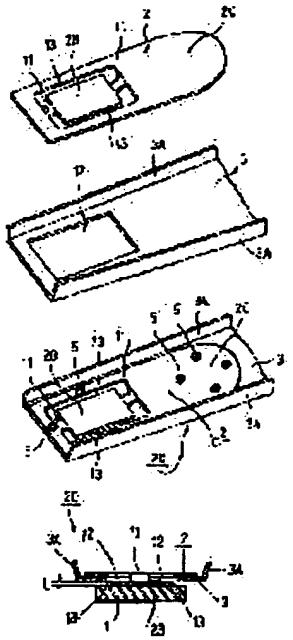
(54) SUPPORTING DEVICE FOR FLOATING MAGNETIC HEAD

(57)Abstract:

PURPOSE: To attain the thinning and miniaturization of a device by forming the recessed part for mounting a slider to be a rolling support structure joined to a tip part of the main body of gimbals through an elastically deformable connection parts having the small dimension in the width direction and the axial line direction.

CONSTITUTION: In the supporting device 20 of a floating magnetic head, the recessed part 2B for mounting the slider 1 is formed on the tip part of the gimbals 2 keeping the specified slit-like space 13 with the main body 2C of the gimbal. This recessed part 2B and the main body 2C are connected by the connection part 11 having the small dimensions in the width and axial line directions. By fitting the recessed part 2B into a punched hole 12 provided at the tip of a load beam 3, the specified dimension L for the gap is secured between a lower surface of the load beam 3 and an upper surface of the 'recessed part 2B. The gap dimension L formed between the lower surface of the load beam 3 and the upper surface of the recessed part 2B is set to about 50μm to maintain the specified rolling characteristic of the slider 1.



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JP-08-077738

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CLAIMS

[Claim(s)]
[Claim 1] In the magnetic-head supporting structure which fixes the gimbal which consists of a light-gage metal plate at the head of a load beam, and comes to form a part for the point of this gimbal in the anchoring part of the slider equipped with the magnetic head Keep a gimbal body and a predetermined slit-like gap in a part for the point of said gimbal, and the crevice for slider anchoring is formed. While connecting between the crevice for this slider anchoring, and said gimbal bodies in the connection section which has a crosswise narrow dimension and the direction dimension of an axis Floatation mold magnetic-head means for supporting which insert in in the hole in which the crevice for said slider mounting was established at the head of said load beam, and come to secure a predetermined clearance dimension between the underside of said load beam, and a crevice top face.
[Claim 2] said connection section -- alienation predetermined with a part for the point of a gimbal body to the axis top of said gimbal and a load beam -- the floatation mold magnetic-head means for supporting according to claim 1 which it comes to constitute from a narrow connection which keeps spacing and lines up by 2 sets [1].
[Claim 3] alienation predetermined to the cross-section top which intersects said connection section perpendicularly with the axis of said gimbal and a load beam by part for the point of a gimbal body -- the floatation mold magnetic-head means for supporting according to claim 1 which it comes to constitute from a narrow connection which keeps spacing and lines up by 2 sets [1].
[Claim 4] said connection section -- alienation predetermined with a part for the point of a gimbal body to the axis top of said gimbal and a load beam -- alienation predetermined to the narrow connection [which keeps spacing and lines up by 2 sets / 1], and cross-section top which intersects perpendicularly with the axis of said gimbal and a load beam by part for the point of a gimbal body -- the floatation mold magnetic-head means for supporting according to claim 1 which it comes to constitute from a narrow connection which keeps spacing and lines up by 2 sets [1].

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention provides a detail with small and the thin shape-ized means of the gimbal currently used for floatation mold magnetic-head means for supporting as a mounting member of a slider further about floatation mold magnetic-head means for supporting.
[0002]
[Description of the Prior Art] Surfacing the magnetic head on a magnetic disk, the magnetic-head means for supporting of the information management system which performs informational record and playback consist of a slider (1) equipped with the magnetic head as shown in drawing 3 , a gimbal (2) supported possible [rolling of this slider (1)], and a load beam (3) which supports this gimbal (2). If it explains to a detail more, the semi-sphere-like dimple (4) is formed in the top face of a mounting eclipse and a gimbal (2) with the support position which can roll the gimbal (2) which becomes a part for the point of a load beam (3) from the conductive metal plate of thin meat, for example, the sheet metal of phosphor bronze, using means for detachable, such as welding (5). A dimple (4) is a magnetic-head configuration member which said slider (1) equipped with the magnetic head follows and rolls to the irregularity of the front face of a magnetic disk, and performs record and playback of magnetic information.
[0003]
[Problem(s) to be Solved by the Invention] In the floatation mold magnetic-head means for supporting (10) of the conventional method shown in drawing 3 Since the semi-sphere-like dimple (4) is welded to the top face of the slider mounting tongue (2A) prolonged in the shape of a cantilever toward a end face side from the head side of a gimbal (2), For example, when the body of a gimbal (2) has 30-micrometer board thickness and it has the height whose dimple (4) is 140 micrometers, the sum total thickness of a gimbal (2) and a dimple (4) in slider anchoring tongue (2A) is set to 170 micrometers. Since the board thickness of a gimbal (2) has the common case where it is set as 25 micrometers thru/or 50 micrometers, when the board thickness of a gimbal (2) is set as 50 micrometers, the sum total thickness of a gimbal (2) and a dimple (4) in slider mounting tongue (2A) amounts to 190 micrometers. Consequently, by the conventional method, even if it makes board thickness of a gimbal (2) thin, only the amount of [of a dimple (4)] height dimension will become [the thickness as a suspension simple substance of magnetic-head means for supporting (10)] large, and a miniaturization and thin-shape-izing of magnetic-head means for supporting will be checked as a result.
[0004] By omitting the attachment of a dimple (4) made unescapable with the floatation mold magnetic-head means-for-supporting floatation mold magnetic-head means for supporting (10) of the conventional method, this invention decreases the thickness of a suspension simple substance, and sets it as the main objects to acquire the floatation mold magnetic-head means for supporting which were excellent in a miniaturization and thin shape-ized effectiveness with this.
[0005]
[Means for Solving the Problem] In the magnetic-head supporting structure which this invention fixes

the gimbal which consists of a light-gage metal plate at the head of a load beam as a solution means of said technical problem, and comes to form a part for the point of this gimbal in the anchoring part of the slider equipped with the magnetic head Keep a gimbal body and a predetermined slit-like gap in a part for the point of said gimbal, and the crevice for slider anchoring is formed. While connecting between the crevice for this slider anchoring, and said gimbal bodies in the connection section which has a crosswise narrow dimension and the direction dimension of an axis It inserts in in the hole in which the crevice for said slider mounting was established at the head of said load beam, and the floatation mold magnetic-head means for supporting which come to secure a predetermined clearance dimension between the underside of said load beam and a crevice top face are offered.

[0006] alienation predetermined [to the axis top of said gimbal and a load beam] in said connection section with a part for the point of a gimbal body -- or [forming from the narrow connection which keeps spacing and lines up by 2 sets / 1] -- or alienation predetermined to the cross-section top which intersects perpendicularly with the axis of said gimbal and a load beam by part for the point of a gimbal body -- or [forming from the narrow connection which keeps spacing and lines up by 2 sets / 1] -- or alienation predetermined with a part for the point of a gimbal body to the axis top of said gimbal and a load beam -- with the narrow connection which keeps spacing and lines up by 2 sets [1] alienation predetermined to the cross-section top which intersects perpendicularly with the axis of said gimbal and a load beam by part for the point of a gimbal body -- it forms in the narrow connection of a total of four front and rear, right and left of the narrow connection which keeps spacing and lines up by 2 sets [1].

[0007]

[Function] The rolling supporting structure of a slider is formed by keeping a gimbal body and predetermined slit-like spacing in a part for the point of a gimbal, forming the crevice for slider anchoring, and inserting in possible [rolling] in the hole in which this crevice was established at the head of a load beam, while connecting between this crevice and gimbal bodies in the connection section which has a crosswise narrow dimension and the direction dimension of an axis, without preparing a dimple.

[0008]

[Example] Hereafter, the example of this invention is explained with reference to drawing 1 and drawing 2 . In addition, with the reference number same as a principle, the same configuration member as drawing 3 which explains the conventional method in the following description displays, and omits explanation about the overlapping matter.

[0009] The floatation mold magnetic-head means for supporting (20) concerning this invention As shown in drawing 1 and drawing 2 , keep a gimbal body (2C) and a predetermined slit-like gap (13) in a part for the point of a gimbal (2), and the crevice (2B) for slider (1) anchoring is formed. While connecting between this crevice (2B) and gimbal bodies (2C) in the connection section (11) which has a crosswise narrow dimension and the direction of an axis By inserting in in the blanking hole (12) in which the crevice (2B) for said slider (1) anchoring was established at the head of a load beam (3) As shown in drawing 2 , the predetermined clearance dimension L is secured between the underside of a load beam (3), and the top face of the crevice (2B) for slider (1) anchoring. Since the clearance dimension L formed between the underside of a load beam (3) and the top face of the crevice (2B) for slider (1) anchoring makes a predetermined rolling property hold to a slider (1), it sets it as about 50 micrometers.

[0010] said connection section (11) -- alienation predetermined to the axis top of a gimbal (2) and a load beam (3) -- alienation predetermined to the cross-section top which intersects perpendicularly with the axis of a gimbal (2) and a load beam (3) as an exception method although the method which keeps spacing and opposite-** by 2 sets [1] is common -- spacing may be kept and you may opposite-** by 2 sets [1].

[0011] In addition, a reference number (3A) shows the side rail prepared in the right-and-left ends of a load beam (3).

[0012]

[Effect of the Invention] Since it is not necessary to attach a semi-sphere-like dimple to the top face of a

gimbal also when it is set as the same dimension as the conventional method showing the thickness of a gimbal in drawing 3 , only the part to which the whole suspension simple substance thickness deducted said clearance dimension L from the height of a hemispherical dimple decreases. If the case where said clearance dimension is set as 50 micrometers is assumed, since a dimple with a height of 140 micrometers does not exist, the 140 micrometers - 50 micrometer, i.e., 90 micrometers, thickness of the slider anchoring section becomes thin per suspension simple substance. Since the method which uses it by making two or more suspension simple substances into a laminated structure is common in order that floatation mold magnetic-head means for supporting may enlarge record / playback capacity, in the floatation mold magnetic-head means for supporting which set the laminating number of stages as eight steps, for example, as compared with the conventional method, the height dimension as the whole equipment decreases and only 720micrometers of miniaturizations and thin-shape-izing of equipment are attained.

[0013] Moreover, in this invention, since the rolling supporting structure which joined the crevice for slider anchoring to a part for the point of a gimbal body through the connection section which has a crosswise narrow dimension and the direction dimension of an axis, and in which elastic deformation is possible is adopt, in spite of not use the semi-sphere-like dimple, the rolling property of a slider and support rigidity are maintain by the level which may be satisfy enough practically.

[0014] Consequently, this invention contributes to thin shape-ization of the suspension simple substance used for high density floatation mold magnetic-head means for supporting 2.5 inches or less, and enables a miniaturization and thin-shape-izing of a hard disk drive unit.

[Translation done.]

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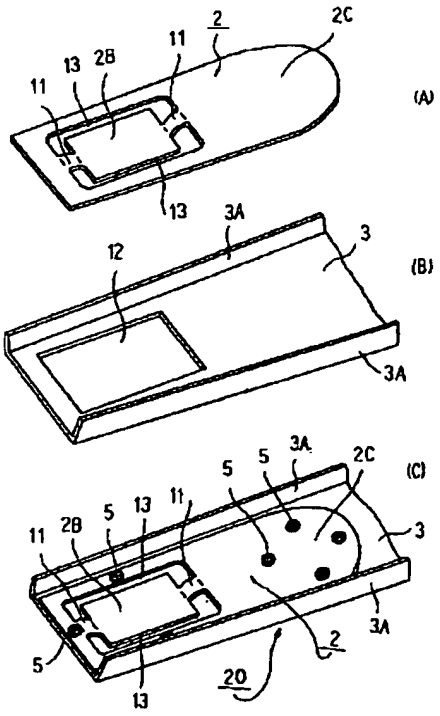
(54)【発明の名称】　浮上型磁気ヘッド支持装置

(57)【要約】

【目的】　浮上型磁気ヘッド支持装置の薄型化と小型化を図る。

【構成】　ジンバル２の先端部分にジンバル本体と所定のスリット状間隔１３を置いてスライダ取付け用の凹部２Ｂを形成し、この凹部とジンバル本体との間を狭小な幅方向寸法と軸線方向寸法を有する連結部１１で接続すると共に、前記凹部をロードビームの先端に設けられた穴１２内に嵌め込み、ロードビーム３の下面と前記凹部２Ｂの上面との間に所定の隙間寸法Ｌを確保する。



【特許請求の範囲】

【請求項１】　ロードビームの先端に薄肉金属板からなるジンバルを固着し、このジンバルの先端部分を磁気ヘッドを具えたスライダの取付け部位に形成してなる磁気ヘッド支持構体において、

前記ジンバルの先端部分にジンバル本体と所定のスリット状間隙を置いてスライダ取付け用の凹部を形成し、このスライダ取付け用の凹部と前記ジンバル本体との間を狭小な幅方向寸法と軸線方向寸法を有する連結部で接続すると共に、前記スライダ取付用の凹部を前記ロードビームの先端に設けられた穴内に嵌め込み、前記ロードビームの下面と凹部上面との間に所定の隙間寸法を確保してなる浮上型磁気ヘッド支持装置。

【請求項２】　前記連結部を、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線上に所定の離間間隔を置き２個１組で整列する狭小接続部から構成してなる請求項１記載の浮上型磁気ヘッド支持装置。

【請求項３】　前記連結部を、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線と直交する横断面上に所定の離間間隔を置き２個１組で整列する狭小接続部から構成してなる請求項１記載の浮上型磁気ヘッド支持装置。

【請求項４】　前記連結部を、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線上に所定の離間間隔を置き２個１組で整列する狭小接続部と、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線と直交する横断面上に所定の離間間隔を置き２個１組で整列する狭小接続部とから構成してなる請求項１記載の浮上型磁気ヘッド支持装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は浮上型磁気ヘッド支持装置に関するものであり、更に詳細には、浮上型磁気ヘッド支持装置にスライダの取付部材として使用されているジンバルの小型・薄型化手段を提供するものである。

【０００２】

【従来の技術】磁気ディスク上に磁気ヘッドを浮上させ、情報の記録と再生を行なう情報処理機器の磁気ヘッド支持装置は、図３に示すように磁気ヘッドを具えたスライダ（１）、このスライダ（１）をローリング可能に支持するジンバル（２）、及びこのジンバル（２）を支持するロードビーム（３）から構成されている。より詳細に説明すると、ロードビーム（３）の先端部分には溶接（５）等の固着手段を利用して薄肉の導電性金属板、例えばリン青銅の薄板からなるジンバル（２）がローリング可能な支持姿勢で取付けられ、ジンバル（２）の上面には半球状のディンプル（４）が形成されている。ディンプル（４）は、磁気ヘッドを具えた前記スライダ（１）が磁気ディスクの表面の凹凸に追従してローリングし、磁気情報の記録と再生を行なう磁気ヘッド構成部材である。

【０００３】

【発明が解決しようとする課題】図３に示す従来方式の浮上型磁気ヘッド支持装置（１０）では、ジンバル（２）の先端側から基端側に向って片持梁状に延びるスライダ取付舌部（２Ａ）の上面に半球状のディンプル（４）が溶接されているため、例えばジンバル（２）の本体が３０μｍの板厚を有し、ディンプル（４）が１４０μｍの高さを有する場合、スライダ取付け舌部（２Ａ）におけるジンバル（２）とディンプル（４）の合計厚みは１７０μｍとなる。ジンバル（２）の板厚は２５μｍ乃至５０μｍに設定される場合が一般的であるから、ジンバル（２）の板厚を例えば５０μｍに設定した場合、スライダ取付舌部（２Ａ）におけるジンバル（２）とディンプル（４）の合計厚みは１９０μｍに達する。この結果、従来方式ではジンバル（２）の板厚を薄くしてもディンプル（４）の高さ寸法相当分だけ磁気ヘッド支持装置（１０）のサスペンション単体としての厚みが大きくなり、結果的に磁気ヘッド支持装置の小型化と薄型化が阻害されてしまう。

【０００４】本発明は、従来方式の浮上型磁気ヘッド支持装置浮上型磁気ヘッド支持装置（１０）で不可避とされていたディンプル（４）の付設を省略することによりサスペンション単体の厚みを減少させ、これによって小型化と薄型化効果に優れた浮上型磁気ヘッド支持装置を取得することを主要な目的とするものである。

【０００５】

【課題を解決するための手段】前記課題の解決手段として本発明は、ロードビームの先端に薄肉金属板からなるジンバルを固着し、このジンバルの先端部分を磁気ヘッドを具えたスライダの取付け部位に形成してなる磁気ヘッド支持構体において、前記ジンバルの先端部分にジンバル本体と所定のスリット状間隙を置いてスライダ取付け用の凹部を形成し、このスライダ取付け用の凹部と前記ジンバル本体との間を狭小な幅方向寸法と軸線方向寸法を有する連結部で接続すると共に、前記スライダ取付用の凹部を前記ロードビームの先端に設けられた穴内に嵌め込み、前記ロードビームの下面と凹部上面との間に所定の隙間寸法を確保してなる浮上型磁気ヘッド支持装置を提供するものである。

【０００６】前記連結部は、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線上に所定の離間間隔を置き２個１組で整列する狭小接続部から形成するか、或いは、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線と直交する横断面上に所定の離間間隔を置き２個１組で整列する狭小接続部から形成するか、或いは、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線上に所定の離間間隔を置き２個１組で整列する狭小接続部と、ジンバル本体の先端部分で前記ジンバル及びロードビームの軸線と直交する横断面

上に所定の離間間隔を置き２個１組で整列する狭小接続部の前後左右合計４個の狭小接続部で形成する。

【０００７】

【作用】ジンバルの先端部分にジンバル本体と所定のスリット状間隔を置いてスライダ取付け用の凹部を形成し、この凹部とジンバル本体との間を狭小な幅方向寸法と軸線方向寸法を有する連結部で接続すると共に、この凹部をロードビームの先端に設けられた穴内にローリング可能に嵌め込むことによって、ディンプルを設けることなくスライダのローリング支持構体を形成する。

【０００８】

【実施例】以下、図１及び図２を参照して本発明の具体例を説明する。尚、以下の記述において従来方式を説明する図３と同一の構成部材は原則として同一の参照番号で表示し、重複する事項に関しては説明を省略する。

【０００９】本発明に係る浮上型磁気ヘッド支持装置（２０）は、図１及び図２に示すようにジンバル（２）の先端部分にジンバル本体（２Ｃ）と所定のスリット状間隙（１３）を置いてスライダ（１）取付け用の凹部（２Ｂ）を形成し、この凹部（２Ｂ）とジンバル本体（２Ｃ）との間を狭小な幅方向寸法と軸線方向を有する連結部（１１）で接続すると共に、前記スライダ（１）取付け用の凹部（２Ｂ）をロードビーム（３）の先端に設けられた打抜き穴（１２）内に嵌め込むことによって、図２に示すようにロードビーム（３）の下面とスライダ（１）取付け用の凹部（２Ｂ）の上面との間に所定の隙間寸法Ｌを確保している。ロードビーム（３）の下面とスライダ（１）取付け用の凹部（２Ｂ）の上面との間に形成される隙間寸法Ｌは、スライダ（１）に所定のローリング特性を保持させるため、５０μｍ程度に設定する。

【００１０】前記連結部（１１）は、ジンバル（２）及びロードビーム（３）の軸線上に所定の離間間隔を置き２個１組で対設する方式が一般的であるが、別法としてジンバル（２）及びロードビーム（３）の軸線と直交する横断面上に所定の離間間隔を置き２個１組で対設してもよい。

【００１１】尚、参照番号（３Ａ）は、ロードビーム（３）の左右両端に設けられたサイドレールを示す。

【００１２】

【発明の効果】ジンバルの厚みを図３に示す従来方式と同一寸法に設定した場合にも、ジンバルの上面に半球状のディンプルを付設する必要がないため、サスペンション単体の全体厚みが半球状ディンプルの高さから前記隙間寸法Ｌを差し引いた分だけ減少する。前記隙間寸法を５０μｍに設定した場合を想定すると、高さ１４０μｍのディンプルが存在しないため、サスペンション単体１個当りでスライダ取付け部の厚みが１４０μｍ－５０μｍ、即ち９０μｍだけ薄くなる。浮上型磁気ヘッド支持装置は記録・再生容量を大きくするため、複数個のサスペンション単体を積層構造にして使用する方式が一般的であるから、例えば積層段数を８段に設定した浮上型磁気ヘッド支持装置では、従来方式に比較して７２０μｍだけ装置全体としての高さ寸法が減少し、装置の小型化及び薄型化が達成される。

【００１３】また、本発明においては、スライダ取付け用の凹部を狭小な幅方向寸法と軸線方向寸法を有する弾性変形可能な連結部を介してジンバル本体の先端部分に接合したローリング支持構造を採用しているため、半球状のディンプルを使用していないにも拘らず、スライダのローリング特性と支持剛性は実用上充分満足し得る水準に維持される。

【００１４】この結果、本発明は２．５インチ以下の高密度浮上型磁気ヘッド支持装置に使用されるサスペンション単体の薄型化に寄与し、ハードディスク装置の小型化と薄型化を可能にする。

【図面の簡単な説明】

【図１】（Ａ）は、本発明に係るジンバルの斜視図、（Ｂ）は、ロードビームの斜視図、（Ｃ）は、前記ジンバルとロードビームの溶接形状を説明する斜視図。

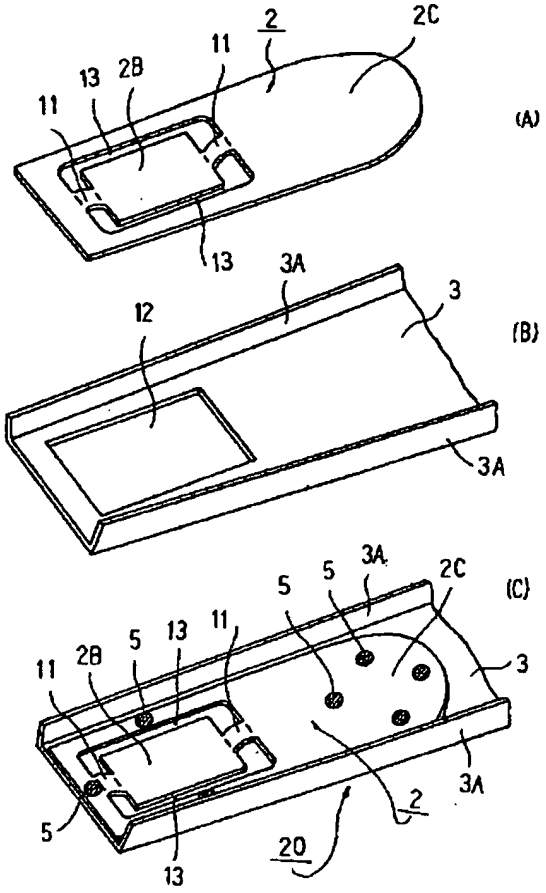
【図２】ジンバル及びロードビームの先端部分の横断面図。

【図３】（Ａ）は、従来型磁気ヘッド支持装置の正面図、（Ｂ）は、その平面図。

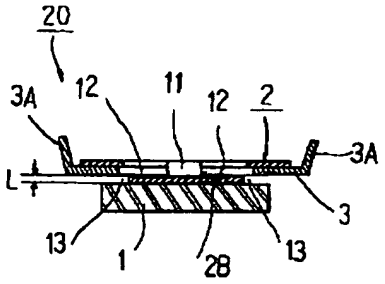
【符号の説明】

１　スライダ
２　ジンバル
２Ｂ　スライダ取付け用の凹部
２Ｃ　ジンバル本体
３　ロードビーム
３Ａ　サイドレール
１１　連結部
１２　打抜き穴（穴）
１３　スリット状間隙
Ｌ　ロードビーム下面とスライダ取付け用凹部の上面との間に形成される隙間寸法
２０　浮上型磁気ヘッド支持装置

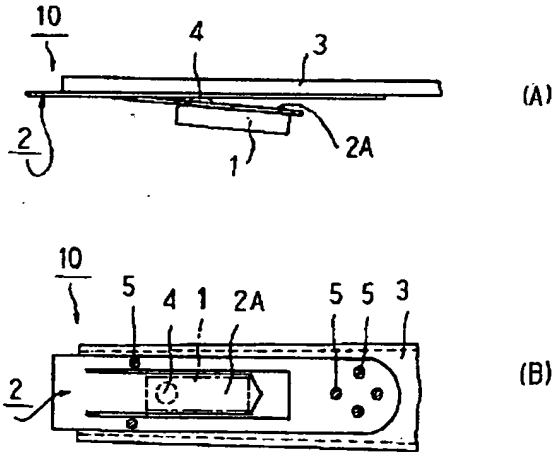
【図１】


2
2C
11
13
2B
11
13
(A)
3A
3
12
(B)
3A
5
5
3A
2C
(C)
11
2B
5
13
11
3
5
3A
2
13
20

【図２】


20
3A
12
11
12
2
3A
L
3
13
1
2B
13

【図３】


10
4
3
2
1
2A
(A)
10
5
4
1
2A
5
5
3
2
(B)